



ATTACHMENT B

Amendments to the Claims

This listing of claims will replace all prior versions, and listings, of claims in the application.

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1. (Currently Amended) An ultrasonic bi-plane imaging probe for invasive medical applications, said probe comprising:

at least one ultrasonic bi-plane transducer mounted at a distal part of the probe and comprising a piezoelectric member and a combination of a first sub-array of transducer electrodes disposed on a first surface of the piezoelectric member and a second sub-array of transducer electrodes disposed on a second surface of piezoelectric member, the first and second sub-arrays of transducer electrodes intersecting each other and being rotated by 90 degrees with respect to each other, the first and second sub-arrays of transducer electrodes being superimposed on the first and second surfaces of the piezoelectric member so as to ~~form~~have a ~~unique~~common transducer ~~foot print~~footprint or a common axis of symmetry; and

first and second flexible interconnection circuits for providing electrical interconnections to said first and second sub-arrays wherein at least one of said interconnection circuits is folded such that the first and second interconnection circuits extend in a common direction; and

a transducer tip located at the distal part of the probe at which the bi-plane transducer is mounted.

2. (Original) An ultrasonic bi-plane imaging probe according to claim 1 wherein the probe further comprises a probe housing and a bendable coupler disposed at a junction between the probe housing and the transducer tip.

3. (Currently Amended) An ultrasonic bi-plane imaging probe according to claim 1 wherein the bi-plane transducer is of a curved shape to provide geometrical focusing of the bi-plane transducer.

4. (Original) An ultrasonic bi-plane imaging probe according to claim 3 wherein said curved shape is one of convex spherical, concave spherical, convex cylindrical, and concave cylindrical.

5. (Currently Amended) An ultrasonic bi-plane imaging probe according to claim 1 wherein the probe includes a longitudinal axis, the bi-plane transducer has an acoustic propagation axis and the bi-plane transducer is mounted so that the acoustic propagation axis thereof is linearly arranged with respect to the longitudinal axis of the probe, ~~such that one azimuthal axis of the bi plane transducer is aligned with the longitudinal axis and the acoustic propagation axis of the bi plane transducer is perpendicular to said longitudinal axis of the probe.~~

6. (Original) An ultrasonic bi-plane imaging probe according to claim 1 wherein the probe has a longitudinal axis and the bi-plane transducer is mounted on the probe at an angle between 30 and 60 degrees with respect to the longitudinal axis of the probe.

7. (Currently Amended) An ultrasonic bi-plane imaging probe according to claim 1 wherein said at least one bi-plane transducer comprises a first said bi-plane transducer and a second said bi-plane transducer mounted in the vicinity of the first said bi-plane transducer, and wherein the second bi-plane transducer is rotated with respect to the ~~second~~first bi-plane array transducer through an angle of between 30 and 60 degrees.

8. (Original) An ultrasonic bi-plane imaging probe according to claim 1 further comprising a conventional phased array transducer mounted on the probe in the vicinity of the bi-plane array transducer.

9. (Original) An ultrasonic bi-plane imaging probe according to claim 1 further comprising a biopsy needle guide for guiding insertion of a biopsy needle.

10. (Currently Amended) An ultrasonic bi-plane imaging probe according to claim 9 wherein the probe has a longitudinal axis, the first sub-array of ~~transducer~~transducer electrodes has a scanning plane aligned with the longitudinal axis of the probe and is used for imaging an organ of interest and the second sub-array of ~~transducer~~transducer electrodes is used for monitoring spatial positioning of the biopsy needle during use thereof.

11. (Currently Amended) An ultrasonic bi-plane combined imaging probe for medical invasive applications, said imaging probe comprising:

a piezoelectric member;

an ultrasonic bi-plane transducer comprising a combination of a first sub-array of ~~transducer~~transducer electrodes on a first surface of said piezoelectric member and a second sub-array of ~~transducer~~transducer electrodes on a second surface of piezoelectric member, the first and the second sub-arrays of ~~transducer~~transducer electrodes intersecting each other and being rotated by 90 degrees with respect to each other, the first and second sub-arrays of ~~transducer~~transducer electrodes being superimposed on the first and second surfaces of the piezoelectric member so as to ~~form~~have a unique common transducer footprint or a common axis of symmetry; and

first and second flexible interconnection circuits for providing electrical interconnections to said first and second sub-arrays wherein at least one of said interconnection circuits is folded such that the first and second interconnection circuits extend in a common direction; and

a linear phased array transducer for transmitting high intensity ultrasonic energy to biologic tissue of interest, the linear phased array transducer being disposed on the probe in the vicinity of the bi-plane transducer;

the bi-plane and the linear phased array transducers being mounted such that the respective acoustic patterns produced thereby intersect at a predetermined distance from the surfaces of the bi-plane and linear phased array transducers.

12. (Original) A combined imaging probe according to claim 11 wherein the probe has a longitudinal axis, the bi-plane transducer has a surface and an acoustic propagation axis, and the bi-plane transducer is mounted with the acoustic propagation axis thereof perpendicular to the longitudinal axis of the probe and the linear phased array transducer forms an angle of less than 180 degrees with the surface of the bi-plane transducer, and the acoustic axis thereof intersects the acoustic axis of the bi-plane transducer at an predetermined distance from the surface of the bi-plane transducer.

13. (Original) A combined imaging probe according to claim 11 further comprising a biopsy needle guide disposed on the probe in the vicinity of the bi-plane and linear phased array transducers for guiding insertion of a biopsy needle in an area of intersection of the transducer acoustic patterns.

14. (Original) A combined imaging probe according to claim 11 wherein the probe has a longitudinal axis and the linear phased array transducer has a propagation axis, and is mounted with the acoustic propagation axis thereof oriented perpendicularly to the longitudinal axis of the probe, the bi-plane transducer being mounted so as to form an angle of less than 180 degrees with the surface of the linear phased array transducer.

15-17. (Canceled)

18. (New) An ultrasonic bi-plane imaging probe according to claim 1 wherein said first and second interconnection circuits extend parallel to one another.

19. (New) An ultrasonic bi-plane imaging probe for invasive medical applications, said probe comprising:

at least one ultrasonic bi-plane transducer mounted at a distal part of the probe and comprising a piezoelectric member and a combination of a first sub-array of transducer electrodes disposed on a first surface of the piezoelectric member and a second sub-array of transducer electrodes disposed on a second surface of piezoelectric member, the first and second sub-arrays of transducer electrodes intersecting each other and being rotated by 90 degrees with respect to each other, the first and second sub-arrays of transducer electrodes being superimposed on the first and second surfaces of the piezoelectric member so as to have a common transducer footprint or a common axis of symmetry; and

a transducer tip located at the distal part of the probe at which the bi-plane transducer is mounted,

the probe including a longitudinal axis, the bi-plane transducer having an acoustic propagation axis and the bi-plane transducer being mounted so that the acoustic axis thereof is linearly arranged with respect to the longitudinal axis of the probe.

20. (New) An ultrasonic bi-plane imaging probe for invasive medical applications, said probe comprising:

at least one ultrasonic bi-plane transducer mounted at a distal part of the probe and comprising a piezoelectric member and a combination of a first sub-array of transducer electrodes disposed on a first surface of the piezoelectric member and a second sub-array of transducer electrodes disposed on a second surface of piezoelectric member, the first and second sub-arrays of transducer electrodes intersecting each other and being rotated by 90 degrees with respect to each other, the first and second sub-arrays of transducer electrodes being superimposed on the first

and second surfaces of the piezoelectric member so as to have a common transducer footprint or a common axis of symmetry; and

a transducer tip located at the distal part of the probe at which the bi-plane transducer is mounted,

said at least one bi-plane transducer comprising a first said bi-plane transducer, and a second said bi-plane transducer mounted in the vicinity of the first said bi-plane transducer, and the second said bi-plane transducer being rotated with respect to the first said bi-plane array transducer through an angle of between 30 and 60 degrees.